



# Newsletter

The Antique Wireless Association of Southern Africa



# 173

December 2020

**THE RECEIVER MAKES THE BIG DIFFERENCE!**

**Selectivity-**  
SHARP AS A RAZOR  
IN CUTTING OUT INTERFERENCE!

**Sensitivity-**  
PICKS UP EVEN  
THE WEAKEST SIGNALS!

THE GREAT NEW  
**GALAXY V**  
**MARK 2**  
**5 BAND-SSB  
TRANSCEIVER**  
MOBILE OR FIXED STATION

**6 WAYS BETTER**  
Yet Still Only **\$420.00**

*The best  
Features  
of any  
Transceiver—*

**So much more Transceiver for the money—  
that it's only a matter of time before  
YOU own one!**

- Smallest of the High-Power Transceivers. (6" x 10¼" x 11¼").
- Great for either Mobile or Fixed Station. No Compromise in power.
- Hottest Receiver of any Transceiver — Special New Six-Crystal lattice filter.
- The personal VFO stability chart of every Galaxy that comes off our line goes with the unit to its new owner!

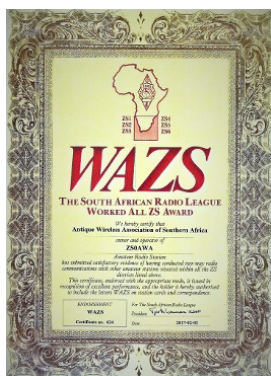
- Complete 80-10 Meter Coverage. 500KC on all bands, with 1 Megacycle on 10 Meters.
- Both Upper and Lower Selectible Sideband.
- Highest Stability. Drifts less than 100 CY in any 15 minute period after warmup.

See your nearest dealer—or write us for Free Brochure

**GALAXY ELECTRONICS**

"Pacesetter in Amateur/Commercial Equipment Design"

10 South 34th Street • Dept. 73-b24 • Council Bluffs, Iowa 51501



### Inside this issue:

HF Happenings	3-5
How do Valves work ?	710
Notices	11

### AWA Committee:

- \* President—Renato ZS6REN
- \* Acting VicePresident—John ZS1WJ
- \* Technical Advisor—Rad ZS6RAD
- \* Secretary/PRO—Andy ZS6ADY
- \* KZN—Don ZS5DR
- \* WC—John ZS1WJ
- \* Historian—Oliver ZS6OG

Visit our website:

[www.awasa.org.za](http://www.awasa.org.za)

## Reflections:

Another year is drawing to a fast close and I think there are so many that wish 2020 had never happened.

In many ways I think there are so many reasons for this. A few good friends have passed on due to the dreaded lurgy, friends and family that will be sorely missed, while we wonder if the same thing would have happened had this not been released on the world. How much does the circle of life have to do when man releases these things upon himself and all those around him ?

Yet through all the sad things that have come upon us in this time, I wonder how many will still see something good having come out of it all.

So much to ponder on and be thankful for for many of us me thinks.

For the AWA it certainly has not been a bad year. We have seen a growth in membership, whether that's because so many have been cooped up in their homes could be

questionable, but we have grown quite considerably.

Our Financial position is also very stable thanks to all the equipment donations that have been sold off at flea markets as well as people looking for parts and tubes.

It's always great to see how many people still want to refurbish and keep our heritage alive.

I don't think we will ever see valves die out completely, and as long as there is a supply of NOS to keep them going, then people will be fixing them.

Let me once again say that the AWA has a rather large stock of valves which is graciously kept for us by Oliver ZS6OG, plus there are many of our members that have their own private stashes. At this present time there is certainly no reason to not be able to repair or refurbish any valve radio in SA.

How often we hear too of those that have been repaired/refurbished that they become favour-

ite operating sets, compared to the newer sets that are so expensively available. (Sorry that should read readily available).

But it's horses for courses and if that is your preference, then don't let anybody take it from you or belittle it. Just be careful about who you tell they are 0.0004 off frequency though.

So at this point, let me take the opportunity to thank all of you the readers, a happy and festive season. May it truly be a blessed time as we enjoy this time with our families, hopefully not under lockdown. Thank you for all the positive feedback that we get, I can't say anything about negative feedback, because we don't get any.

Here's to a stocking full of presents and new antennas in the sky, We will see you all again in 2021

Best 73

DE Andy ZS6ADY

## Wikipedia

### Radio Propagation:

Measuring HF propagation:

HF propagation conditions can be simulated using radio propagation models, such as the Voice of America Coverage Analysis Program, and realtime measurements can be done using chirp transmitters. For radio amateurs the WSPR mode provides maps with real time propagation conditions between a network of transmitters and receivers.

Even without special beacons the realtime propagation conditions can be measured: a worldwide network of receivers decodes morse code signals on amateur radio frequencies in realtime and provides sophisticated search functions and propagation maps for every station received.

## HF Happenings

### Volunteers Needed for Propagation Research Project --

From our friends at HamSCI... HamSCI ([www.hamsci.org](http://www.hamsci.org)) is looking for amateur radio operators around the world to help collect propagation data during the 14 December eclipse across South America. Data collection requires an HF radio connected to a computer. There will be 24-hour practice runs on 21 November and 5 December. The main data recording will run from 9 to 16 December, to ensure an abundance of control data. Details of the experiment may be found at <https://hamsci.org/december-2020-eclipse-festival-frequency-measurement>. Instructions are also available in Spanish and Portuguese. Interested operators should sign up at <https://forms.gle/C9PFSTeLf7xvCQDYA> or directly contact Kristina Collins at [kd8oxt@case.edu](mailto:kd8oxt@case.edu).

### The Results of the 6th SARL Wednesday 80 m Club Sprint

Sixty-two logs, reflecting 932 QSOs, were received for the 6th leg of the Wednesday 80 m Club Sprint held on 18 November 2020

After the 6 legs

- 1st the West Rand ARC – 5 917 points
- 2nd the Boland ARC – 4 964 points
- 3rd the Bo-Karoo ARC – 1 878 points
- 4th the Hibiscus ARC – 717 points
- 5th the Magalies ARC – 439 points
- 6th the Bloemfontein ARC – 378 points
- 7th the Sandton ARC – 254 points
- 8th the Rustenburg ARC – 242 points
- 9th the Northern Cape ARC – 185 points
- 10th the Cape Town ARC – 170 points
- 11th the Vrystaat ARC – 64 points
- 12th the Secunda ARC – 60 points
- 13th the Potchefstroom ARC – 50 points
- 14th the Pretoria ARC – 46 points
- 15th the Lichtenburg ARC – 37 points
- 16th the Highway ARC – 18 points

### CQ WW WPX Contests: New Rules

A new "Multi-Transmitter Distributed" category is being added to the CQ World Wide WPX RTTY, SSB and CW contests to better accommodate operators who wish to compete as a team without all being in the same physical location. The new category will permit up to six separate stations in different locations to operate as a single contest entry. All equipment, including remotely-controlled equipment, must be located in same DXCC Entity and CQ Zone. Although inspired by innovations being made in response to the Corona virus pandemic, this new, stand-alone category will be permanent. It is not intended to replace, or compete with, other multi-operator categories. In addition, QSO alerting systems will now be permitted in all CQ WW WPX SSB and CW Single Operator categories, except the Single Operator Classic Overlay categories. There will no longer be separate listings or recognition for "Assisted" vs "Unassisted" categories and all Classic overlay entries must be unassisted. This step further aligns CQ WW WPX SSB and CW contests with CQ WW WPX RTTY, where the use of QSO alerting systems has been permitted since the mid-nineties.

Also, the maximum operating time for Single Operator Classic Overlay participants has been reduced from 36 to 24 hours.

Finally, the Multi-Operator Single Transmitter High and Low Power Classic Overlay categories have been removed from the rules.

The rule changes take effect with the 2021 running of the WPX contests (RTTY on 13 and 14 February, SSB on 27

Calendar:

### December

- 1 – start of YOTA Month
- 3 - International Day for Persons with Disabilities
- 5 – Radio Amateur Examination and SARL 95 40 m Club Sprint
- 7 - International Civil Aviation Day
- 10 - International Human Rights Day; Chanukah
- 11 - International Mountain Day
- 12 and 13 – the ARRL 10 m Contest
- 13 and 14 - Geminids meteor shower
- 16 - Day of Reconciliation
- 21 - Summer Solstice (12:02); conjunction of Jupiter and Saturn
- 21 and 22 - Ursids meteor shower
- 25 – Christmas Day
- 26 – Family Day
- 31 - End of YOTA Month and the CQ DX



and 28 March and CW on 29 and 30 May). These changes do not apply to the CQ World Wide (CQ WW) DX contests. The full rules for CQ WW WPX SSB and CW 2021 will be posted on <https://www.cqwpw.com/> in early 2021.

### Cabrillo Log Evaluator Software

There are many responsibilities for a successful radio contest sponsor, not the least of which is scoring the actual event. For those starting a brand-new event who are not up for the task of writing custom software to take (probably) Cabrillo logs, applying scoring criteria, and calculating a score, check out the Cabrillo Log Evaluator software from W3KM <https://www.qsl.net/w3km/cabrillo.htm>. With frequent updates, it touts the ability to score a wide range of contests. What is more, the programme author offers to supply contest-specific setup files for first-time contest sponsors.

### CHROME

CHROME, the Google web browser, proclaims better performance and consumption of fewer system resources in a recent blog post, which will benefit those running on a laptop or other battery-powered devices <https://blog.google/products/chrome/faster-chrome/>. However, the way it accomplishes some of those improvements is by providing fewer resources to background browser tabs. If you are using multiple tabs to keep track of multiple sources of spot information in a contest (as one might do in a rover situation for a VHF/UHF contest), you may see the behaviour of those tabs change, leading to delayed or missing alerts or updates. The exact behaviour may depend on the website and the way the specific backgrounded page has been written. Something to keep in mind if you notice a difference.

### Headphones to Headset

Your favourite headphones can be turned into your favourite *headset* with the addition of the Antlion Audio Mod-mic attachable microphone <https://antlionaudio.com/>. It can magnetically attach to an existing headset. Kirk, K4RO, says this about it in a post to CQ-Contest email reflector: "Add it to your favourite headphone set (it clips on magnetically) and you'll be rocking with some great transmit audio for 50 bucks."

### Sights and Sounds

Paul, W6PNG, went mobile (as K7E) to combine radio contesting and camping during the California QSO Party in May. His expedition to Mineral County, Nevada, is documented in a travelogue-style post on Paul's website <https://nomadic.blog/2020/08/01/becoming-k7e/>. Paul's takeaways from the experience include bringing a cooler with better food, an amplifier, and a directional antenna to take advantage of the terrain.

Steve, VE6WZ, provides a tour of the control side of his successful remote station, which includes extensive receive arrays <https://www.youtube.com/watch?v=fd6DkobdIK4>. His quick 15-minute video discusses the rationale behind some of his station building decisions.

Tim, K3LR, provided a virtual station tour of his multi-multi station to the Bay Area DXers Contest Club <https://www.youtube.com/watch?v=7UHVYNG36oA>. You, too, can use YouTube to see some of the hard work that enables those stellar contest scores.

### African DX

*Contacts with stations on the African continent count towards the SARL's All Africa Award ([www.sarl.org.za/public/awards/awards.asp](http://www.sarl.org.za/public/awards/awards.asp))*

Tunisia, 3V8. Ashraf "Ash", 3V4-002 (KF5EYY) will be active as 3V8SS from the Radio Club Station of Tunisian Scouts in Sousse during the CQ WW DX CW Contest (28 and 29 November) as a Single-Op/All-Band/Low-Power entry. QSL via LoTW or LX1NO.

Mauritania, 5T7. Tom, DL7BO, is expected to be active as 5T7OO from Mauritania soon and plans to be there for a long time. Activity will be on various HF bands. QSL via DJ6TF.

Somalia, 6O. Ali, EP3CQ, announced on Twitter (<https://twitter.com/EP3CQ>) that he will once again be active as 6O1OO from Somalia starting 15 November for two months. As always, his activity will be limited to his spare time because he works for the UN Department of Safety and Security (UNDSS) in Mogadishu.



Operations are on 160, 80, 60, 40, 30, 20, 17, 15, 10 and 6 metres using CW, SSB and FT8. The 6O1OO station is currently the only active and licensed Amateur Radio Station in Somalia. QSL direct to Ali Solhjoo, Schnackenburgstr. 3, Berlin 12159, Germany. QSL cards will be replied to on a bi-monthly basis. IRC's are not accepted. Ali states that all QSL cards received (by 10 November 2020) for 6O1OO were replied and dispatched.

### African Islands

Comoros, D6. Don, K6ZO/7Q6M (ex-D68GA), is now active as D60AB from Comoro Islands (AF-007) as of 17 November. He has permission to be active on 160, 40, 20, 17, 15, 12 and 10 metres. He has been spotted on 40/20/17/15 meters CW after 17:00 UTC and again after 23:00 UTC. Length of his stay possibly ends 24 November. He will head back to Malawi on 26 November to join the 7Q7WW team (Don, N6ZO and Junior, 7Q7JN) for the CQ WW DX CW Contest (28 and 29 November) and then return to Washington on 5 December.

Pantelleria Island, IH9. Raf, IH9YMC will operate the CQ WW CW contest from Pantelleria Island (AF-018). QSL via LoTW, eQSL.



### Radio Frequency Interference

Jim, K9YC, also publishes and updates his document "A Ham's Guide to RFI, Ferrites, Baluns, and Audio Interfacing" on his website <http://k9yc.com/RFI-Ham.pdf>. On page 23, he discusses the use of common mode chokes to reduce or eliminate common mode noise from portable generators, like the kind that DXpeditions or Field Day-style contest operations use. If you are thinking of going portable to get away from "city" RFI, be sure to verify you are not also bringing noise sources with you.

### Band Stop Filter

Steve, VE6WZ, made a video on how he constructed a band-stop filter to minimize interference to broadcast band reception while he was transmitting on 160 metres [https://www.youtube.com/watch?v=\\_fZgDaodas4](https://www.youtube.com/watch?v=_fZgDaodas4). He walks through calculating the values for circuit components using an online tool from WA4DSY, selecting a filter design and then construction of the circuit. He finishes up using a nanoVNA with NANOSAVER software to characterize his build.

### The Results of the fifth SARL 95 40 m Club Sprint

The fifth leg of the SARL 95 40 m Sprint was held on Saturday 31 October 2020 and 36 logs were received, reflecting 719 QSOs.

#### After the five Sprints

- 1<sup>st</sup> the West Rand ARC – 5 390 points
- 2<sup>nd</sup> the Bo-Karoo Arc – 1 348 points
- 3<sup>rd</sup> the Hibiscus ARC – 798 points
- 4<sup>th</sup> the Boland ARC – 754 points
- 5<sup>th</sup> the Magalies ARC – 414 points
- 6<sup>th</sup> PEARS - 378 points
- 7<sup>th</sup> the Vrystaat ARC - 162 points



# ESSE Specials!

## SCR-522 100-150 Mc. RECEIVER AND TRANSMITTER

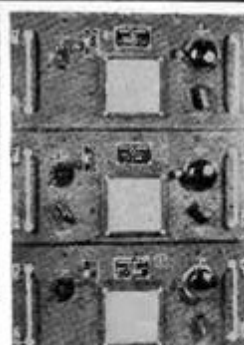
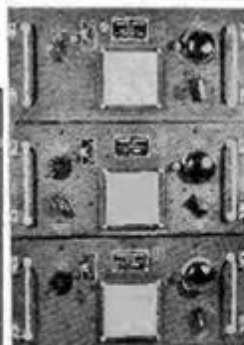
One of the most interesting and useful pieces of war surplus equipment. Designed for plane and ground station use, this unit offers remote control at any four pre-selected crystal controlled frequencies in the spectrum of 100-150 Mc. This spectrum covers facsimile, air navigation aid, airport control, railroad police, urban telephony, as well as the amateur band 1.44-1.48 Mc. Octodes Radio News gives details for converting the SCR-522 receiver section, BC-624. Transmitter section, BC-625, is voice amplitude modulated and has an output of 8-9 watts.

Tubes used and included: 2-6X2, 3-12A6, 1-6X5, 2-6X7, 1-12SG6, 3-12SG6, 1-12SC6, 1-6X5, 3-6X5, 1-12AH6T.

These units were removed from planes but are guaranteed good and shipped in operating condition, including tubes, control head, and cable plugs ready to connect to dynamotor or other power supply.

Weight, 45 lbs. Shipping weight approx. 55 lbs.

Price.....\$39.95 each



## TELRAD MODEL 18-A FREQUENCY STANDARD

Measures signals 100 Kc.-45,000 Kc., with check points at 10, 100, and 1,000 Kc. with a high degree of accuracy. Power supply is self-contained for operation from 110, 130, 150, 220, and 250 V. 25-60 cycles AC.

Complete with tubes, dual crystal, and instruction book.

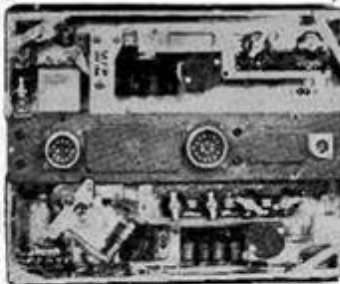
Brand new, in original carton.....\$24.95

## BC-375-E GENERAL ELECTRIC MOPA TRANSMITTER

Used as liaison transmitter in bombers and ground stations. Frequency range of 200-500 Kc. and 1,500-12,500 Kc. is covered by means of 7 plug-in tuning units furnished. By slight modification operation on 10 and 20 meters is possible. Oscillator is self-excited temperature compensated type. Power amp. is neutralized class "C", using 211 tube and is equipped with antenna coupling circuit to match practically any antenna. Modulator is class "B" using two 211 tubes. Power supply is 24 V. DC dynamotor which furnishes 1,000 V. at 350 M.A. However, transformer shown on this page is ideal for construction of 110 V. AC power supply. Transmitter output conservatively rated at 42.5 watts, phone 75 watts CW, but may be pushed to 150 watts. Complete as shown with tubes, dynamotor, seven tuning units, and cable connector plugs. Removed from bombers but checked and guaranteed.

Price complete.....\$36.95

Weight, approximately 150 lbs.



Dynamotor for 24 V. DC operation of SCR-522.....\$1.50. Wt., 39 lbs.



## LS-3 LOUDSPEAKER

6" PM type, housed in heavy metal case. For use on BC-348 Receiver. Self-contained output transformer to match 4,000 ohm impedance. Used but guaranteed satisfactory.

Price.....\$7.50 each

## BC-348 COMMUNICATIONS RECEIVER

Excellent selectivity, sensitivity and stability make this the most outstanding of any receiver yet available from government surplus. This receiver will give outstanding performance wherever used. Built to withstand vibration and features gear driven 100:1 ratio remote tuning control. Six bands—200-500 Kc. and 1.5-18 Mc. Two stages RF, 3 stages IF, BFO, crystal filter, manual or AVC. Complete with tubes and 24 V. DC dynamotor. Easily converted to 110 V. AC operation. These receivers used, but can hardly be told from new. Guaranteed operation. Models R, M, P, and Q available—please specify.

Price.....\$44.75 each



## H. V. PLATE POWER TRANSFORMER

1425-0-1425 sec. at 750 ma. Pri. 110-115 V. 60-cycle, tapped for low and high power. These transformers were made for RCA equipment. Size, 10 1/4" x 10" x 8". Weight, 81 lbs. Brand new.....\$17.50 each

3-10 Hy. 750 ma. Swinging Choke for filtering of power. 5,000 V. insulation. Size 6 1/2" x 7 1/4" x 8". Weight, 38 lbs. Brand new, \$7.50 each



**TERMS:**  
CASH with ORDER  
or 25%  
BALANCE C.O.D.  
All Items  
Shipped Collect

# ESSE

## Radio Company

130 W. New York St. • Indianapolis 4, Ind.



# How Do Valves Work?

Paul Stenning – Vintage Radio.com

To those of us who have been brought up with transistors, valves can seem unnecessarily complex. On this page, I will attempt to explain the workings of the valve in a clear simple manner - without the atomic theory and the maths!

---

## A Brief History Lesson

In 1883, Thomas Edison was experimenting with electric lamps. In his early experiments, the glass bulb was becoming dull, and he wondered if this was due to particles being given off by the filament. He fitted a metal plate inside the bulb to attract these particles, and found that if the plate was at a positive potential a current would flow from the filament.

Later Professor Flemming found that current only flowed when the plate was positive, and that the arrangement could be used to rectify an alternating voltage. He patented this in 1904.

Lee de Frost then discovered that, by placing a wire between the filament and plate, the current could be controlled. Thus he invented the Triode (or Audion as he called it) - the first ever electrical amplifying device.

---

## Thermionic Emission

When a metal is heated to a sufficiently high temperature in a vacuum, it will give off electrons. These will be attracted to any electrode that is at a more positive potential.

Most metals will melt by the time they are hot enough to emit a significant amount of electrons. Tungsten is an exception, which gives good emission at 2300 to 2500 degrees Centigrade, and melts at 3380 degrees Centigrade. This would glow almost as bright as an electric lamp, which was a characteristic of early Bright Emitter valves. In later valves, the tungsten was coated with an oxide (such as barium or strontium) which gives good emission at around 700 degrees Centigrade.

In most valves, the emitting conductor is a separate component to the heating filament. The emitting conductor is known as the cathode, and is normally in the form of a thin tube. The heater passes inside the cathode and is electrically insulated from it. This is known as an indirectly heated cathode. Some valves have directly heated cathodes, where the heater and cathode are the same component. These were frequently used in battery sets.

---

## Electron Flow vs Conventional Current Flow

We are now used to thinking of current flowing from positive to negative. However current is actually a flow of electrons in the opposite direction. This anomaly is the result of an incorrect assumption by early scientists, which has become established - hence we have the separate terms Electron Flow and Conventional Current Flow.

To avoid confusion (hopefully!), think in terms of electron flow when considering the actual workings of the valve, and current flow when thinking about the circuit.

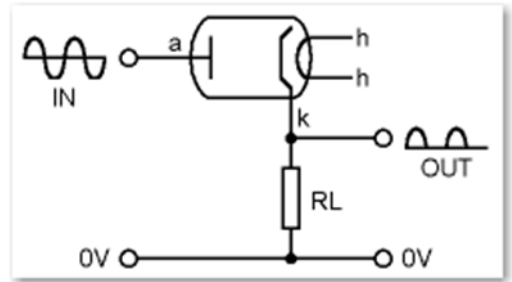
---

## The Diode

The electron collecting plate is known as the anode. It normally consists of a cylinder of metal around the cathode, a few millimetres away.

When the anode is at a positive potential relative to the cathode, current will flow. This is useful for detection and rectification, but is obviously incapable of amplification.

A rectifier valve has larger, more substantial electrodes than a detector diode, to cope with the much greater currents involved. This diagram shows a rectifier valve circuit with an AC input and a half-wave rectified DC output.



A smoothing capacitor would normally be connected across the load (RL) to give a relatively steady DC supply. The load would normally be the remainder of the circuit rather than a single resistor.

The valve electrodes are indicated by the normal abbreviations - a for anode, k for cathode and h for the heater connections. A heater supply is not shown in the diagram for simplicity.

## The Triode

By adding a spiral of wire between the cathode and the anode, it is possible to control the current flowing between them. This spiral of wire is known as the control grid.

Referring to this diagram, if a varying signal is applied to the control grid (g1) via C1, the anode current will vary in sympathy. By placing a resistor (Ra) between the anode and the positive supply, the varying current will be converted to a varying voltage on the anode.

In normal use the control grid will not be at a positive potential relative to the cathode, otherwise it will act as another anode and draw current (known as grid current). It is normally biased a few volts negative (although some triodes are designed to be biased at 0V). In very early radio sets, a separate grid bias battery was used, often having several tapplings to give different bias levels - but this was quickly superseded.

Usually cathode biasing will be used. Instead of connecting the cathode directly to ground (0V), it is connected via a low value resistor (Rk). This will drop a few volts, so the cathode will be a few volts positive. The control grid is at high impedance and draws virtually no current. It is normally connected to ground via a high resistance (Rg), and the signal is coupled via a capacitor (C1).

If Ck is omitted, the voltage at the cathode will vary with the anode current. This causes negative feedback which gives a reduction in gain (and also reduces distortion). Ck is fitted to obtain the maximum gain from the stage, and has a low impedance over the signal frequency range.

Triode valves are mainly used for low level audio amplification. Their use is limited at radio frequencies because of the capacitance between the control grid and the anode. Although this is only a few pF, the "effective capacitance" is approximately equal to this value multiplied by the stage gain. This effective capacitance becomes the input capacitance of the stage, and has a drastic shunting and detuning effect on a radio frequency signal.

## The Tetrode

The tetrode was a development of the triode, designed to overcome this problem. A second grid is placed between the control grid and the anode. It is known as the screen grid, and acts as an electrostatic screen, the purpose being to minimise the capacitance between the control grid and anode. For this to work it must be connected to ground at signal frequencies. If it were connected directly to 0V it would act as another control grid and greatly reduce the anode current. It is therefore often connected to the HT rail via a resistor to drop some voltage, and decoupled to 0V with a suitable capacitor.

The tetrode solves the capacitance problem allowing operation at high frequencies, and also gives greater gain. However, it introduces another problem - distortion. This is caused by secondary emission, which is too involved to describe in this brief article. Consequently the tetrode is seldom used, but it is included here because it is an important stage in the development of a better solution.



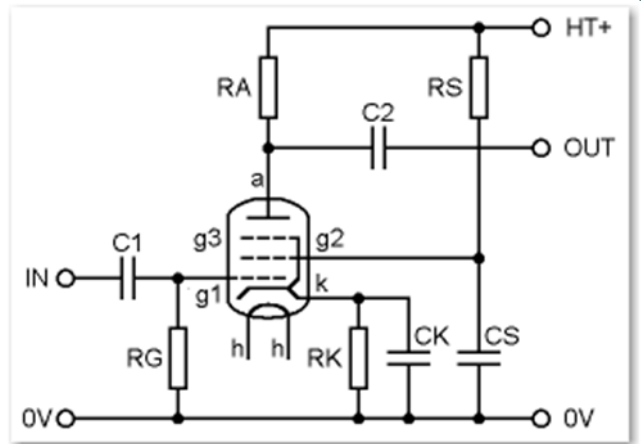
## The Pentode

As its name implies, the pentode has five electrodes. Four of them are the same as those in the tetrode, namely the cathode, control grid, screen grid and anode.

To suppress the secondary emission a further grid, known as the suppresser grid, is added. This is normally connected to the cathode, sometimes internally within the valve envelope, otherwise a separate connection is provided.

The result is a valve that retains the advantages of the tetrode - high gain and operation at high frequencies - without the distortion. Pentodes are commonly encountered in RF and IF amplifier stages, and in amplifier power output stages.

This diagram shows a basic pentode amplifier stage. This is fairly similar to the triode circuit discussed previously, with the addition of the connections to the screen and suppresser grids (g2 and g3).



## Vari-mu Valves

It is often necessary to be able to control the amplification (gain) of a valve either manually or automatically. This is commonly required in the AGC (Automatic Gain Control) circuits in radio receivers.

To achieve this the spacing of the wires that make up the control grid are varied, being closer together at the centre and wider apart at the ends. By varying the negative voltage on this grid, the gain can be adjusted.

## Pentode Power Amplification

This diagram shows a typical Class-A pentode output stage. The anode load resistor is replaced with the primary of the output transformer (T1), which drives the loudspeaker (LS1). The purpose of the transformer is to convert the relatively high anode impedance of the valve to the low impedance of the speaker.

Since the output transformer is inductive, its impedance varies with frequency giving an uneven frequency response. A capacitor (Ca) is often connected in parallel with the transformer primary, which corrects this to a great extent (this is sometimes referred to as tone correction). In some cases more than one capacitor is used, together with series resistors to give correction that is more accurate. The screen grid (g2) is shown connected to the HT supply after a decoupling resistor (Rd). This is a common arrangement in valve radio receivers.

A resistor is placed in series with the control grid (g1). This works in conjunction with the input capacitance of the valve to attenuate the high frequencies (above the audio range) to ensure stability.

Many hi-fi amplifiers and some more expensive valve receivers use a Class-B push-pull output stage. This is an involved subject in its own right and will not be covered in this brief article. A higher quality output transformer is normally used in conjunction with negative feedback, which makes impedance correction capacitors (such as Ca) unnecessary.

## Other Valve Types

A number of special-purpose valves have been produced with a greater number of electrodes. For

example, Hexodes, heptodes and octodes (containing six, seven and eight electrodes respectively) are sometimes used in mixer-oscillator stages. The operation of these valves is rather complex and I will not attempt to describe them here!

## Combined Valves

Often more than one valve section is contained in a single glass envelope. These sections normally share the same heater connections and are sometimes interconnected.

For example, the mixer-oscillator valve in radio receivers often consists of a hexode (or similar) and triode sections in the same envelope. The triode is used as the oscillator section and the hexode acts as the mixer and amplifier. The two sections may be connected internally within the valve, or externally.



**Tomorrow's Tube TODAY!**

# NEW RCA 813

**gives 260 watts output  
with less than 1 watt  
Driving Power!**

**IT'S A FACT!** This sensational new RCA Beam Power Transmitting Tube actually requires less than one watt driving power to give 260 watts output in Class "C" Telegraph service. Needing no neutralization, a pair of 813's makes a bang-up final for that quick-band-change, high-power transmitter.

The new 813, is among the finest transmitting tubes RCA has ever developed, employs a new stem structure which makes practical a compact tube—only 7 1/2" long—having very short heavy leads and low lead inductance. Because of its design, this new high-power beam tube can be operated at full ratings up to 30 megacycles without neutralization.

Other noteworthy features of this new tube are: Heavy-duty thoriated-tungsten filament, oversized graphite plate, dome-top bulb with cushion mount supports, low screen current, and a new Giant 7-pin base having short shell and wide pin spacings.

*Typical Operation (Class "C" Telegraphy)*

Filament Voltage	10 volts (a. c. or d. c.)
Filament Current	3 amperes
D-C Plate Voltage	2000 volts
D-C Screen Voltage	400 volts
D-C Grid Voltage	-90 volts
D-C Plate Current	180 milliamperes
D-C Screen Current	15 milliamperes
Driving Power	0.5 watt
Power Output	260 watts
Price	\$28.50 Amateur Net.



View of modified glass stem assembly showing individual lead leads.

Cut-away view showing short, heavy leads to terminal pins.



## Radio Tubes

RCA MANUFACTURING COMPANY, INC., CAMDEN, N. J.  
A Service of the Radio Corporation of America

**CONTACT US:**

P.O. Box 12320  
Benoryn  
150

Mobile: 082 448 4368  
Email: andyzs6ady@vodamail.co.za

Get your backdated issues at  
[http://www.awasa.org.za/  
index.php/newsletters](http://www.awasa.org.za/index.php/newsletters)

Visit our Website:  
[www.awasa.org.za](http://www.awasa.org.za)

Antique Wireless Association  
of Southern Africa

**Mission Statement**

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yester-days radio's and associated equipment. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association. Join by logging in to our website.

**Notices:****Net Times and Frequencies (SAST):**

Saturday 06:00 (04:00 UTC) —AM Net—3615

Saturday 07:00 (05:00 UTC) —Western Cape SSB Net— 3640

Saturday 08:30 (06:30 UTC)— National SSB Net— 7140; Sandton repeater 145.700

Echolink—ZS0AWA-L; ZS6STN-R

Relay on 3615 for those having difficulty with local skip conditions.

Saturday 14:00 (12:00 UTC)— CW Net—7020; (3550 after 15 min if band conditions not good on 40)

Wednesday 19:00 (17:00 UTC) — AM Net—3615, band conditions permitting.

**AWASA WhatsApp group:**

Should you want to get on the AWA WA group where a lot of technical discussion takes place, send a message to Andy ZS6ADY asking to be placed on the group. This is a no-Nonsense group, only for AWA business.  
+27824484368